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Abstract

OBJECTIVES, ORGANIZATIONAL ASPECTS AND UTILIZATION OF THE IEA-R1 RESEARCH REACTOR.

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A brief description of the IEA-R1 research reactor, including irradiation and beam facilities, as well as some comments on the objectives of its utilization, are presented. Some items related to the overall organization such as: general management, operation section, safety committee, emergency procedure, health physics, and other supporting services, are discussed.

The scientific and technological work so far performed with the reactor, and the means available to accomplish this work, are treated in some detail. Emphasis is given to the collection of experimental data leading to better operational performance and utilization.

Experiments carried out with the reactor for education and training purposes are briefly described. Some of these experiments have been included in the curricula of courses on nuclear science and engineering, sponsored by the Brazilian Nuclear Energy Commission, and given by various institutions.

Radioisotope production, one of the main activities related to the use of the reactor, is discussed, so far as the irradiation, chemical processing, labelling of compounds, and distribution aspects are concerned.

Research work in nuclear physics is concentrated mainly in the field of nuclear data (neutron cross section measurements), and results so far obtained are summarized. The design of a neutron-gamma converter, to be installed in one of the reactor tangential channels, is under way. The use of this facility either for photonuclear or neutron capture gamma-rays studies are discussed. A solid state physics project is also mentioned. Neutron monochromators such as a crystal spectrometer and a mechanical velocity selector, designed and constructed at the IEA, were utilized in several projects. These instruments, a proton recoil chamber and other techniques were also used to specify the reactor neutron spectra in a broad range of energies.

Radiochemistry research covers activation and isotope dilution analysis and general tracer work with short and medium half-life radionuclides produced in the IEA-R1. Early work on activation analysis using single-channel pulse-heigh analysers and recent improvements , including the use of multichannel analysers and a special pneumatic rabbit station for short-lived radioisotopes, are mentioned.

The irradiation of biological material such as seeds,plants and small animals is considered, and sample preparation, irradiation devices and dosimetry, are discussed. The irradiation of equipment and some materials for special purposes is also described.

Some aspects of the cooperation with other scientific and technical institutions and future trends with regard to the reactor utilization, are presented.